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ABSTRACT

Research findings demonstrate that the way the classroom environment is arranged can have important consequences on the attitudes, behavior, and achievement of students. The concept of "synomorphy" is used to examine some of the research literature available on classroom design. Synomorphy refers to the similarity of structure or shape between the behavioral aspects of a school activity program and the physical aspects of the environment. Ecological theory predicts that when synomorphy is low, changes will occur in the physical milieu and/or in the kinds of behavior. The first section of the paper applies this theory to open plan schools. The schools were designed for open education, but teachers using traditional educational programs have modified programs and erected physical boundaries to bring the milieu closer to their teaching styles. The paper's next section cites studies of the classroom environments modified in order to improve the degree of synomorphy between the teacher's instructional program and the physical milieu. The final section examines the extent to which teachers ordinarily rearrange the classroom so that the milieu and the program remain in a state of synomorphy throughout the school day and year. An extensive bibliography is appended. (MLF)

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The design of educational environments: An expression of individual differences or evidence of the "press toward synomorphy?"

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The design of educational environments: An expression of individual differences or evidence of the "press toward synomorphy?"

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The relationship between the design of environments and human behavior has been an area of growing interest among social scientists in many disciplines including educational researchers. The design of educational environments is an issue that is faced by all classroom teachers, but one that few teachers have been trained for as part of either their pre-service or in-service education. Unfortunately, for the teacher who is interested in learning about how to arrange the classroom environment, there is little information available. Although some educational psychology textbooks are beginning to include sections on classroom design, in most instances, the authors rely on common sense and educational folklore when discussing this important topic (Howell & Howell, 1979; Knirk, 1979; Musgrave, 1975). The few articles on this topic that are based on research findings are in publications that neither students training to be teachers, nor practicing teachers are likely to read (e.g., Weinstein, 1980). This paper will review some of the research literature available on classroom design. Rather than trying to prescribe the "best" way to arrange the classroom, this paper will provide a framework that can be used when facing this task.

One way teachers can approach the task of classroom design is as an opportunity for them to express their "personalities" through the arrangement and decor of the environment and as a chance to demonstrate their creativity

in the arrangement of space. Indeed, at the moment of the school year when student teachers gain complete control of the classroom, one of the first things many student teachers do is rearrange the students' desks, often in very innovative designs. While expressions of creativity are certainly desirable, it will be argued in this paper that facing the task of classroom design solely as an opportunity to be creative, and holding creativity as a goal in and of itself, is not an appropriate way to approach this important teaching task.

Research demonstrates that the way in which the classroom environment is arranged can have important consequences on the attitudes, behavior, and even the achievement of students. (See Weinstein (1979) and Phyfe-Perkins (1977) for reviews of this literature.) Research has shown for example that the size, shape, and arrangement of rooms and passageways; number and size of windows and doors; arrangement of furniture; and interior illumination, temperature, noise, odor, and color are among the variables that can influence behavior (King & Marans, 1979; McCormick, 1970). Researchers have found that room size (Ittelson, Proshansky, & Rivlin, 1972), room furnishings (Richardson, 1970), furniture arrangement (Sommer, 1959, 1962, 1969), floor covering (Preiser, 1972), wall and floor color (Srivastava & Peel, 1968), temperature (Wyon, 1969), light (Lofberg, Lofstedt, Nilsson, & Wyon, 1973), and location within a room (Adams & Biddle, 1970) all affect behavior. The way in which furniture is arranged affects opportunities for social contact (Sommer & Ross, 1958), patterns of participation in instructional activities and communication among students and between students and teachers (Cartwright & Zander, 1968), feelings of students and teachers (Maslow & Mintz, 1956; Nogami, 1976), friendship patterns within the class (Blake, Rhead, Wedge, & Mouton, 1956), the general morale of students (Leavitt, 1951), and student achievement (An-

derson, 1970; Shaw, 1971). Thus, attention to the kinds of behavior to be supported by the environment must be attended to when the teacher is arranging the classroom.

When facing the task of arranging the classroom environment, one of the first decisions to be made is whether the teacher wants to assume complete responsibility for the design, or whether to involve the students in the design process. How teachers can involve students in classroom design has been discussed by several authors (David, 1975; Holt, 1975; Rivlin, Rothenberg, Justa, Wallis, & Wheeler, 1975; Sanoff & Barbour, 1975) and will not be included as part of the present discussion since the kinds of questions that are asked when deciding how to arrange the environment are the same regardless of the number of people involved in the design process.

Activity Segments and the Concept of Synomorphy

Teachers divide each school day into a series of learning activities, or what Gump (1969) has called "activity segments." An activity segment is an environmental unit consisting of both physical and behavioral components. The physical elements of a segment consist of features of the milieu such as the size of the space, the arrangement of furniture, and the objects available for use in the segment. The behavioral component of a segment consists of the patterns of behavior that occur every time the segment operates. The behavioral component of the segment is its "program of action" and is stable regardless of the particular individuals who inhabit the segment on a particular occasion. Another characteristic of segments is that they have physical and temporal boundaries. They occur in a particular location, contain specific behavior objects, and occur during a particular span of time.

Examples of common segments that occur in elementary schools are the morning flag salute, reading circles, individualized seatwork, and the creation of works of art. Each of these segments calls for different kinds of behaviors, and different physical arrangements. To salute the flag, children must be able to rise out of their seats and face the flag which might be held by the teacher, a child, or might simply be permanently displayed on a hook on the wall. The most appropriate arrangement for a reading circle is one where chairs are arranged so that children can see and interact with one another; in seatwork, teachers generally (although not always) do not want children to interact, so a seating arrangement that does not encourage interaction (e.g., a row-and-column arrangement, or a circular arrangement with students facing the outside of the circle) would be appropriate. During the construction of art projects, if materials are to be shared, a physical arrangement in which children are seated together at tables would be called for. This similarity of structure or shape between the behavioral aspects of the segment (i.e., the program) and the physical aspects of the segment (i.e., the milieu) has been termed synomorphy by Barker (1968).

Spatial Arrangements in Open Plan Schools

When two or more segments operate during the same period of time, and are physically adjacent to one another, it is important that the behaviors in one segment do not permeate and weaken the standing patterns of behavior in the other. At any particular moment in time, children in three physically adjacent segments might be involved in very different activities; perhaps an art lesson in which teams of four children work cooperatively on safety posters; individualized reading from books selected from the school library; and a math exam in which children are graded on the number of problems they accurately

complete within a limited amount of time. Walls and doors are boundary features present in traditional school buildings which segregate and thus protect adjacent segments with differing and perhaps incompatible standing patterns of behavior.

A relatively recent trend in school design which has drawn attention among educators to the importance of the environment and has provided the impetus for research on the design of school environments has been the construction of open plan school buildings. In the design of open plan buildings, physical boundaries between adjacent segments are absent. No longer can you walk into a school and be guaranteed that you will encounter a long corridor with classrooms of thirty children and one teacher safely protected by four walls and a door. Instead, you might find yourself among perhaps two hundred children and seven adults, all sharing the same large room. One of the first schools to draw attention for excluding interior walls was an elementary school in Carson City, Michigan that opened in 1957 (Farmer & Weinstock, 1971). By 1970, over fifty percent of all new American schools were of open plan construction (Walsh, 1975). Although teachers in all schools are faced with the task of designing the classroom environment, open plan buildings make this task, and the importance of the task, more apparent than it is in traditional buildings.

Although a variety of factors contributed to the construction of open plan buildings, one of the factors was an educational rationale. It was believed by many educators and architects that providing buildings without interior walls would make the space flexible and able to accommodate many different kinds of educational programs. Variations in school organization common today include team teaching, departmentalization, multi-age grouping and the utilization of teaching machines and other media. Each organization of

instruction has implications for how the interior space should be arranged. For example, while departmentalization of instruction would be best accommodated in a physical milieu that allowed children to move easily and rapidly from one teacher to another but with separate spaces for each teacher, schools in which teachers taught in a "team" would require larger spaces that could accommodate many children and at least two teachers simultaneously.

In particular, it was felt that open plan buildings would be especially suitable for "open" educational programs. Just as open plan buildings are constructed so that the physical boundaries within a space are removed, open educational programs similarly attempt to dissolve many of the programmatic boundaries found in more traditional educational programs. For instance, open programs are often organized in terms of an "integrated day" concept in which the boundary traditionally found between academic content areas (e.g., reading, mathematics, economics) is dissolved and projects that integrate many content areas are worked on for extended blocks of time. Another common feature of open educational programs is a team teaching approach in which several teachers are available to students, throughout the day, to be used as resource personnel by the children. In fact, teachers are only one of the resources made available to students in an open educational program. Other resources such as books, science equipment, audio-visual equipment, and consumable materials (paper, colored markers, paints) are important aspects of many open programs and need to be accessible to the students throughout the day.

While an open plan school building might assist teachers impiementing an open educational program, it clearly is not compatible with a traditional program in which the programmatic boundaries between children in different grades, for children in different classes within each grade, and even for different segments of the day within each class, are purposely made quite

distinct. Unfortunately, research conducted since the construction of these schools has documented that in most instances traditional, instead of "open" educational programs actually operate in many of these buildings (Gump & Ross, 1979; Ross, 1980; Traub, Weiss, Fisher, & Musella, 1972). Traditional educational programs are not compatible with open plan buildings, and thus a situation in which program and milieu are not synomorphic apparently exists in many open plan schools.

Ecological theory predicts that when synomorphy is low, changes will occur in the physical milieu and/or in the kinds of behavior that occur in that milieu until the milieu and behavioral program "come to terms" and greater synomorphy is established (Barker, 1968; Gump & Ross, 1977; Ross, 1980). Thus, when teachers try to implement relatively traditional programs in an open plan facility, one would expect changes to occur in the program and/or the physical space until a more synomorphic relationship is achieved.

In an initial study examining the "press toward synomorphy," Gump and Ross (1977) interviewed teachers in three open plan schools regarding changes which had occurred in their buildings over time. Changes that occurred in the educational program and in the physical milieu were documented. Teachers in this study reported that when they thought that a particular activity was likely to interfere with the program of a physically adjacent segment, the program was either modified so as to be less obtrusive (e.g., on one occasion, children were asked by their teacher to "whisper" when singing "Happy Birthday" to a classmate), rescheduled to occur at a time mutually agreed upon by all teachers in the area (e.g., in one school all teachers had art simultaneously so that they would not disturb one another), or the potentially obtrusive activity was omitted from the educational program completely (e.g., in traditional schools teachers sometimes spontaneously provided children with an

opportunity to "stretch" and get some physical exercise to interrupt long periods of sedentary work; in open plan schools such activities rarely, if ever, occured).

Another way that teachers protected the patterns of behavior in spatially adjacent segments was through the reassignment of activities to new locations within the milieu (e.g., the science teacher was reassigned from his initial location within the open area to an area walled in on three sides, where the noise generated by the movies he showed and experiments he conducted would not be as disturbing to other teachers and students; the library was moved from a totally open part of the school, to a glass-enclosed room to provide the librarian with more control over the library resources).

A second kind of milieu adaptation which occurred in this school was the introduction of physical boundaries where barriers were not originally present. Although there are many anecdotal reports that teachers in open plan schools frequently use classroom furniture to improvise walls (e.g., Drew, 1970; Frazier, 1972), Gump and Ross (1977) were the first investigators to quantify the extent that furniture was used by teachers to form boundaries in open space schools.

Gump and Ross (1977) found that the construction of physical boundaries was significantly more extensive in the lower, as opposed to the upper grades and tended to be more extensive between teaching areas than between teaching and non-teaching areas. This pattern of shielding was quite consistent with the idea of program and milieu "coming to terms." In this school, primary classes operated as self-contained units and showed more shielding of boundaries than in the intermediate grades where the educational program called for some exchange of children between classes.

In a later study, Gump and Ross further pursued the issue of the extent to which teachers in open plan schools use furniture to create boundaries; this time with a sample of 21 open plan buildings (Gump & Ross, 1979; Ross, 1980). They found that the physical openness of these schools was reduced by teachers in a variety of ways, including the use of classroom furniture, and in some cases, through the construction of permanent walls. In eight schools, modification was minimal, but in six schools, classroom furniture placed between teaching areas dramatically modified the original openness. In seven schools, self-contained classrooms were essentially created.

The extent to which open programs were actually operating in these open plan buildings was also examined. Based on the amount of team teaching, large group instruction, movement of pupils to various teachers, and individualization of instruction that occurred in each class, an index of program openness was calculated. In general, open programs were not operating in these schools of open physical design. Obviously, the construction of an open plan building was not able, in and of itself, to cause teachers to implement an open educational program. However, consistent with the principle of synomorphy, there was a significant negative relationship between program openness and the percent that original physical openness was reduced. In other words, modifications were made in these schools until a more synomorphic relationship between program and milieu was established.

These studies indicate that the principle of synomorphy is manifested in the arrangement of learning spaces at the building level. Responsibility for establishing and maintaining synomorphy at the building level is usually assumed by the principal. The principal must decide at the start of each school year the physical location that will become each teacher's "territory." Being cognizant of the idea of synomorphy, the principal would be able to arrive at

a more satisfactory solution to the assignment of space and one that will function more efficiently, than if only individual preferences, teacher seniority, or habit was used to assign teachers to learning areas. In open plan schools, where the activities of one teacher have an impact on surrounding teachers, the educational program operating in the school must be carefully considered when learning areas are assigned. If two teachers state at the beginning of the school year their desire to join their students together for selected activities, they obviously should be assigned to adjacent teaching spaces. Similarly, if the principal would like to encourage particular teachers to team teach, or even cooperate in the planning of their lessons, assigning these teachers to adjacent spaces, and scheduling simultaneous planning periods for them would increase the probability that the interaction desired would occur (Brunetti, Cohen, Meyer, & Molnar, 1972; Byrne, 1961; Carson, Johnson, & Oliva, 1974; Gans, 1970; Martin, 1975).

Spatial Arrangements Within the Classroom

The need to pay attention to the kinds of segments that teachers in physically adjacent spaces operate is a concern primarily for teachers in open plan schools. However, teachers in buildings of all designs must attend to the design of their personal teaching area.

One basic design issue that teachers must address when arranging the classroom is whether the space should be organized in terms of personal territories or by functions (Weinstein, in press; Woolfolk & Nicolich, 1980). When classrooms are organized by territory, each student has a desk and has both the freedom and responsibility that is associated with private ownership. When classroom are organized by function, the space is divided into interest areas, or work centers, and all spaces are available to all students. Of

course, few classrooms are arranged strictly in terms of personal territories, or functional areas. Instead, most classrooms, combine both kinds of arrangements.

Classrooms Organized by Territory

When space is organized by personal territories, the major decision to be made is how to arrange the students' desks. To make this decision intelligently, the teacher must be clear regarding the goals to be achieved by the furniture arrangement. Just as there is no one "best" teaching method that can be used in all teaching situations, there is no one "best" seating arrangement. The seating arrangement which is "best" depends on the activities which will be implemented in the classroom and the degree of interaction between students and the amount of movement throughout the room that will be demanded by the activities and desired by the teacher.

Proshansky and Wolfe (1974) describe two ways in which the design and arrangement of space and furniture in classrooms are factors in achieving instructional goals. First, physical and spatial aspects of classrooms communicate a symbolic message of what is expected to happen in a particular place (Weinstein & Woolfolk, 1979). Second, classroom design can directly facilitate or interfere with learning. Howie and Winkleman (1979) argue that regardless of how furniture is arranged, teachers must be careful that the nonverbal messages communicated by the arrangement are congruent with the teacher's verbal messages regarding the behavior expected to occur in the setting.

Data are not available to indicate whether teachers are generally successful in designing environments congruent with their educational goals. However, one attempt by a group of experimenters to produce positive behavioral changes in a group of disruptive sixth graders through "improve-

ments" in the design of the environment illustrates a situation in which the altered environment apparently was not congruent with the instructional activities implemented by the teacher. Winett, Battersby, and Edwards (1975) implemented architectural changes, a program of individualized instruction, and introduced group contingencies during mathematics and language periods in a sixth grade class. The introduction of individualized instruction and group contingencies resulted in improved academic performance, improved social behavior, and changed patterns of child-child and child-teacher interaction. However, the architectural changes failed to produce any academic or behavioral improvement and in fact, academic performance during language activities became somewhat worse during this phase of the experiment.

The educational program that operated in this classroom when the architectural changes were made was one in which the children were required to do work individually, all on the same task. The architectural change made in this experiment consisted of changing the seating arrangement from a row to a table formation. The inability of this modification to produce positive behavior change is not surprising since the row arrangement that the teacher had originally chosen for these students was more congruent with the individualistic goal organization of the activities operating in this setting than the table arrangement implemented by the experimenters. Johnson (1979) provides a useful discussion of the kinds of seating arrangements that can be used most successfully for activities based on an individualistic goal structure. Seating arrangements and patterns of circulation most suitable for cooperative and competitive task organizations are also discussed by Johnson. Another useful discussion of the advantages and disadvantages of various seating arrangements is provided by Musgrave (1975) who also discusses which seating arrangements are useful for teacher-centric methods of teaching, and

which formations best accommodate student-centric methods.

Educational folklore suggests that circles, squares, horseshoes and arrangements in which students are seated at tables are more conducive to verbal interaction than row and column seating arrangements. Unfortunately, few empirical investigations of the effects of such "innovative" seating arrangements are available. In one experimental analysis of alternate seating arrangements, Axelrod, Hall, and Tams (1979) compared a row and column seating arrangement and table arrangements. Two experiments were conducted. In each experiment, one table arrangement was compared with a row arrangement. In the first experiment, the table arrangement consisted of three tables with four children seated at each table, and one table with five children. In the second experiment, the table condition consisted of pairs of children facing one another. The results of these experiments indicated that when the children were sitting in rows, they spent a higher percentage of their time engaged in study behavior and there were fewer incidences of children talking out than when sitting at tables. In both of the experiments conducted by Axelrod and his colleagues, the teachers expected children to work independently when completing written assignments, and to participate in verbal interaction only with the teacher and only after being asked to speak by the teacher. Yet, in both classrooms, the original seating formation at the start of the experiment was one in which children were seated at tables.

While table formations might be useful when teachers want students to interact with one another, when children are expected to work independently, or when teacher-centric methods of instruction such as lectures are used, the traditional row and column formation is the most appropriate seating arrangement. In this arrangement, all students face the teacher and similarly, the teacher can easily observe all students.

Seating position within the traditional row and column arrangement is probably the most thoroughly investigated aspect of the physical design of the classroom (Weinstein, 1979). In general, the findings of these studies indicate that when students sit in rows, a front-center seat facilitates student achievement, positive attitudes, and participation -- at least for those students already predisposed to speak in class (Adams, 1969; Adams & Biddle, 1970; Koneya, 1976; Rist, 1970; Schwebel & Cherlin, 1972; Sommer, 1967; Stires, 1979). Presumably the benefits obtained by students who sit in the front-center seats are due to increased opportunities for those students to interact verbally and nonverbally with the teacher who generally also is found in the front-center position. The existence of what Adams and Biddle (1970) termed the classroom "action zone" implies that when row formations are used, teachers must take actions to assure that all students obtain the advantages associated with the action zone either by rotating where students sit at different times of the school year, or by making sure that they circulate among the rows of children whenever they lecture.

Classrooms Organized by Function

Classrooms organized by function are most commonly found in day care centers, preschools, and kindergartens. However, some teachers of older children do organize their classroom by functional areas. This is a common arrangement for example, among teachers implementing "open education" programs of instruction. Even in classrooms in which most of the space is devoted to individual territories, some classroom space is usually organized by functional areas as well.

The arrangement of desks is not a concern when the classroom is organized by functions. Instead, when the classroom is to be organized by functional areas, decisions to be made involve how many areas the space will accommodate,

what the functions will be, and how the functional areas will be arranged in relationship to one another.

Prescott, Jones, and Kritchevsky (1967) suggested four principles that teachers should remember when organizing functional areas within day care centers: (1) the need for clear, visible paths from one area to another, (2) the importance of having no less than one-third to no more than one-half uncovered floor space in order to aid movement, (3) the need to avoid play units that are hidden from the children's view and (4) the need to avoid the creation of "dead space," large empty space that seems to "trap" children and encourage rough-housing. Kritchevsky and Prescott (1969) found that teachers who did not incorporate the above four suggestions in their room arrangements, were controlling and restricting with the children. They spent much of their time telling student what they were not supposed to do and had to stress rules repeatedly. The students seemed uninterested and uninvolved in class activities, and were often involved in fights and conflicts. Although the authors attributed many of the teachers' management problems to the poor spatial arrangements, because this study was correlational, we can not be certain that the problems observed were actually due to the design of the classrooms.

When classrooms are organized by functional areas, and children have a choice among the available activities, some areas tend to be used more than others. In an early observational study conducted in a nursery school, Shure (1963) recorded the use of five activity areas (art, books, dolls, games and blocks) during free play. She found that more children occupied the block area than any other area studied, with the art area being second in popularity. The book area was the least popular of the areas studied. With the exception of the games area, all areas showed some sex differences in regard to the frequency with which boys and girls entered the areas.

More recent studies conducted in classrooms organized by functional areas have similarly found that children do not distribute themselves equally among the areas and that boys and girls differ in the amount of time they spend in each area. A number of studies report that boys spend more time playing in the block area, and girls spend more time in the housekeeping area (Clark, Wyon, & Richards, 1969; Coates, Lord, & Jakabovics, 1975; Sears, 1965; Vance & McCall, 1934). In most classrooms these two settings are either clearly divided or physically separated from one another, an arrangement that serves to promote this separation of the sexes in play. Shure (1963) suggested joining the housekeeping and block areas so that materials from both settings could be used together to enrich children's play. She argued that by linking the two areas, the range of children's play experiences could be expanded by offering a greater variety of materials and providing interaction with more varied groups of peers.

Kinsman and Berk (1979) conducted an experiment in which they actually removed the barriers that divided the block and housekeeping areas and observed the effect of this design modification on the behavior of nursery school and kindergarten children. In contrast to what was expected, after the shelves were removed, girls did not spend more time in the block area and boys in the housekeeping area. However, several other aspects of their behavior were influenced by removing the barriers between the two settings. The most evident change involved children's social behavior. There was a decrease in same-sex play and an increase in mixed-sex interaction for the younger children (i.e., the preschoolers).

Kinsman and Berk anecdotally reported that the kindergarten children resisted the experimental changes which had been implemented and in fact used a line of large toy trucks, a large mirror, an ironing board, a doll crib, and

a bed to redivide the two play areas. Apparently, the older and younger children wanted to use their play time differently, and the older children were willing to expend the effort it took to modify the play environment to be congruent with their intention of playing primarily with same-sex peers.

Another experiment in which one of the purposes was to increase children's use of particular areas within a classroom was conducted by Weinstein (1977). After observing the behavior of second- and third-graders in a classroom organized in terms of functional areas, design changes were made with specific behavioral goals in mind, and a two-week post-change observation period was conducted. The three goals of the design changes were: (1) to encourage the use of areas that were infrequently visited, (2) to increase each area's ability to accommodate a variety of activities, and (3) to facilitate the use of manipulative materials. The changes that were made in the classroom included the addition of shelves to display materials and to provide additional storage, the provision of additional writing surfaces and furniture designed for individual study, and the use of furniture as partitions between areas. In most cases, the desired behavioral changes were achieved after the design changes were implemented.

Perkins (1979) attempted a similar intervention in a day care center where aspects of the physical environment seemed to hinder children's task involvement during free play. Changes were made in the boundaries between areas, the design of circulation paths, and the display of educational materials. Perkins' modifications resulted in a significant increase in the amount of constructive play and the level of task involvement.

While both Weinstein and Perkins were able to obtain clear changes in the behavior of students, in neither of these studies can the changes confidently be attributed to the changes in the classroom arrangements since control

schools were not used thus resulting in a one shot case study design (Campbell & Stanley, 1963). Both of these studies are clearly important though since they demonstrate the kinds of changes that can be made as well as the simplicity with which the changes can be implemented and student behavior observed.

Modification of School Environments

In the previous section, studies in which experimenters modified classroom environments in order to improve the degree of synomorphy between the teacher's instructional program and the physical milieu were examined. The way in which synomorphy is established at the building level within open plan schools was examined in an earlier section. A remaining issue to examine is the extent that teachers ordinarily rearrange the classroom arrangement so that the milieu and program remain in a state of synomorphy throughout the school day and year.

The arrangement of classroom space and furniture is a task that most teachers are quite aware of at the start of the school year. However, it is a mistake for teachers to assume that once the classroom is arranged in the fall, the design of the room no longer needs to be considered. Just as teachers vary the teaching methods they use throughout the school day, and certainly throughout the school year, the arrangement of the room also often needs to be varied over time. While many teachers vary the seating of children throughout the year merely to provide variability and to introduce novelty in the classroom, there are other reasons that seating should be varied.

The most important reason that furniture arrangements should be changed is that teaching methods change. As already emphasized in this paper, some arrangements are more appropriate for certain methods than others. While one

would not expect the teacher to rearrange the furniture for each lesson the teacher probably should at least consider the arrangement of the furniture how materials will be displayed, how movement will occur, etc. as each lesson is planned (Yinger, 1977; 1979).

When two segments occur within the same physical location, sequentially in time, the transitional period during which time one segment is dissolved and the next segment is created is a critical period of time. When the teacher wants the reading circle segment to begin, instructions are given to the children to get their readers, perhaps a pen or pencil, and to move to the part of the space where the reading circle will occur. After this transitional period during which time the teacher and students form the milieu for the new segment, the pattern of behavior known as "reading circle" can begin. Changes in components of the milieu as well as changes in the standing pattern of behavior occur during the transition, and it is generally the responsiblity of the teacher to insure that the changes that occur in both aspects of the environment are synomorphic with one another. Obviously, the establishment of synomorphy during these periods of time are a concern of all teachers, regardless of whether the design of their school consists of self-contained classrooms, or completely open space.

Designing buildings that are potentially flexible, and providing furniture and partitions that are relatively easy to move, of course does not insure that these features will be utilized. Although it requires only 1.4 minutes to make a major rearrangement of more than 75 percent of the furniture in the classroom (smaller moves take less than one minute), for the most part the furniture remains stationary (Sanders, 1958).

Rothenberg and Rivlin (1975) conducted a study in two open plan schools to determine the extent to which these potentially flexible settings were

changed over time. Room plans were recorded on a bi-weekly basis. The findings from one classroom were reported in detail. In this particular room, there was one arrangement, for most of the year, that divided the room into four parts. In the course of the year, the areas essentially retained their integrity. Changes appeared in the placement of desks, small tables and low bookcases. The major change in this room was the addition of a free-standing loft in early October. The relatively unchanging picture of the furnishings found for this room was representative of all classes. Most rooms remained intact with movement generally occurring to small pieces.

Clearly, there are many instances in which alternate physical arrangements would be more appropriate for a particular educational program, yet modifications are not made. One explanation for why teachers do not alter the physical environment of the classroom more frequently is because of what Fred Steele (1970; 1973) has termed the perception of pseudo-fixed-space. Pseudo-fixed-space is space that is perceived by users of the space as being rigid and inflexible, although various modifications of the space are in fact possible. Often this rigidity stems from institutional sanctity or the unwillingness of people to deviate from a familiar pattern. In other cases the pseudo-rigidity is produced by the policies of the people responsible for maintaining the space, frequently the janitors or custodians.

Unfortunately, many people are passive inhabitants of environments, allowing synomorphy to occur naturally through behavior change, rather than deliberately designing the settings so that their goals are obtained (Boutorline, 1970; Steele, 1973). This passivity has been documented in low-income housing projects (Perin, 1972) and frequently occurs in educational environments as well.

Teachers must be sensitive to the kinds of physical arrangements appropriate to the segments they operate. Taking the time to arrange (or if necessary to rearrange) the physical environment so that it will support the kinds of behaviors the teacher desires will be time well spent. Without attention to this aspect of the setting, behaviors that are synomorphic with the arrangement which <u>is</u> provided will occur, or alternatively the segment will operate at less than an optimal level of efficiency.

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